

**Eiler Fire Salvage and Restoration Project  
Invasive Plant Species Risk Assessment  
Hat Creek Ranger District  
Lassen National Forest**

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## **Introduction**

When a ground-disturbing action or activity is proposed, an Invasive Plant Species Risk Assessment (IPSRA) determines the risk of introducing or spreading invasive plants within the project area. This document analyzes factors that contribute to invasive plant introduction and spread. It considers factors that are independent of the proposed action (current invasive plant inventory, current habitat vulnerability, vectors not related to project implementation) and factors that are associated with the proposed action (habitat alteration and increased vectors expected as a result of project implementation). This document will also discuss how Integrated Design Features may reduce risk factors, and will summarize the overall anticipated invasive plant response to the proposed action of the Eiler Fire Salvage and Restoration Project (Eiler Project).

## **Factors Independent of the Proposed Action**

### **1. Current Invasive Plant Inventory**

The Eiler Project area is located on approximately 33,162 acres in the Hat Creek (#4), Logan (#9), and Thousand Lakes (#15) Management Areas. Eiler Project treatment units include approximately 8,702 acres on NFS lands, most of which burned at high severity during the 2014 Eiler Fire. Multiple surveys have been conducted within the project area in conjunction with past projects, but no project-specific, post-fire floristic or invasive plant surveys were conducted (Table 1). In addition to the project surveys listed in Table 1, the project area was evaluated for potential detrimental effects of invasive plants on native plant communities during the August, 2014 Eiler Fire Burned Area Emergency Response (BAER) assessment (USDA FS 2014a); however, the presence or absence of invasive plants could not be determined in areas where vegetation was completely consumed by fire.

**Table 1.** Invasive Plant Surveys in the Eiler Project Area

Project	Survey Date
Thousand Lakes	1993
Boyle Insect Salvage	1993-94
Heavenly Insect Salvage	1994
Honn Campground Bypass Road	1998
Dutch Flat Wildlife	2000
Hat Creek Work Center Construction	2002
Roadside Hazard Tree Salvage	2004
Backbone	2004
OHV Route Designation	2009
Thousand Lakes Trails	2012

Source: USDA FS 2014b

The California Department of Food and Agriculture's invasive plant list (CDFA 2015a) divides invasive plants into categories A, B, and C. A-listed weeds are those for which eradication or containment is required at the state or county level. For B-listed weeds, eradication or containment is at the discretion of the County Agricultural Commissioner. C-listed weeds require eradication or containment only when found in a nursery or at the discretion of the County Agricultural Commissioner (CDFAb). Fifteen invasive plant occurrences are known to the Eiler Project area (Table 2, USDA FS 2014c). Four occur within project treatment units. The other occurrences are either outside of proposed treatment units or on private lands, with most located along the Highway 89 corridor. Additional invasive plant occurrences likely occur on private lands within the project area, but would be outside of Eiler Project treatment units.

**Table 2.** Occurrences of invasive plant species within the Eiler Project area

Common Name (Scientific Name)	CDFA Rating	Owner- ship	Occurrence Number	Description	Project Unit
<b>Canada thistle</b> ( <i>Cirsium arvense</i> )	B	NFS	LNF #42	Near Hat Creek Work Center and Highway 89. Three plants dug in 2010.	--
<b>dyer's woad</b> ( <i>Isatis tinctoria</i> )	B	NFS	LNF #1	Near Honn Campground and Highway 89. Thirty plants treated in 1997 and 1998; no plants seen subsequently.	--
<b>Klamathweed</b> ( <i>Hypericum perforatum</i> )	C	NFS	LNF #10	Near Honn Campground and Highway 89. Twenty to 65 plants dug yearly between 1998-2008.	--
<b>Klamathweed</b> ( <i>Hypericum perforatum</i> )	C	NFS	LNF #49	South of Honn Campground, along Highway 89. Forty plants pulled in 2003; 14 in 2007.	--

<b>Common Name</b> ( <i>Scientific Name</i> )	<b>CDFA Rating</b>	<b>Owner- ship</b>	<b>Occurrence Number</b>	<b>Description</b>	<b>Project Unit</b>
<b>Klamathweed</b> ( <i>Hypericum perforatum</i> )	C	PRIV	PRIV #67	Near Opdyke Hill. Thousands of plants pulled in 2006.	--
<b>medusahead</b> ( <i>Elymus caput-medusae</i> )	C	NFS	LNF #79	Brown Butte. Thousands of plants scattered across approximately 230 acres.	243 256 2560
<b>spotted knapweed</b> ( <i>Centaurea stoebe</i> ssp. <i>micranthos</i> )	A	PRIV	PRIV #19	Highway 89, 0.4 miles south of Hat Creek Work Center. Fifty plants pulled in 2000, 100 pulled in 2002.	--
<b>squarrose knapweed</b> ( <i>Centaurea squarrosa</i> )	A	LNF	LNF #5	West side of Duden Butte, at intersection of 34N76 and 34N76E. Hundreds of plants found in 2000. Treated for 7 years. No plants seen since 2008.	2160 2230
<b>squarrose knapweed</b> ( <i>Centaurea squarrosa</i> )	A	LNF/ PRIV	LNF #7	Along northeast shoulder of Highway 89 northwest of Brown Butte. Most on private lands. Treated by Shasta County.	--
<b>squarrose knapweed</b> ( <i>Centaurea squarrosa</i> )	A	PRIV	PRIV #9	Highway 89, 0.6 miles south of Hat Creek Work Center. 250 plants dug in 2006.	--
<b>whitetop</b> ( <i>Cardaria</i> sp.)	C	PRIV	PRIV #14	Highway 89, 1.15 miles south of Hat Creek Work Center. Five plants pulled in 2004.	--
<b>yellow starthistle</b> ( <i>Centaurea solstitialis</i> )	C	LNF, PRIV	LNF #52	Along Road 34N76 NW of Brown Butte. An estimated 10,000 plants occur; several thousand have been pulled and weed-whacked between 2000-2011	256 2100 2560
<b>yellow starthistle</b> ( <i>Centaurea solstitialis</i> )	C	LNF	LNF #72	At Hat Creek Work Center. Several hundred to a thousand plants pulled annually since 2002.	--
<b>yellow starthistle</b> ( <i>Centaurea solstitialis</i> )	C	LNF	LNF #91	Along Highway 89 0.1 miles south of Honn Campground. 3,000 observed in 2005, 400 pulled in 2011.	--
<b>yellow starthistle</b> ( <i>Centaurea solstitialis</i> )	C	LNF	LNF #97	Hundreds of thousands of plants on Brown Butte. Mapped as occurring on roughly 300 acres.	256 2560

## 2. Current Habitat Vulnerability

The Eiler Project area ranges in elevation from 3,240 to 7,840 feet. Prior to the Eiler Fire, vegetation within the project area included mixed conifer forest, red and white fir forest, pine plantations, lodgepole pine stands, whitebark pine stands, Baker cypress stands, aspen stands, white oak and black oak woodlands with gray pine, montane chaparral, wet and mesic meadows, and grasslands. Approximately 69 percent of the project area burned at very high severity in the Eiler Fire of 2012, 6 percent burned at moderately high severity, and 25 percent burned at low to moderate severity (Eiler Fire Salvage and Restoration Project

Report for Fire and Fuels, Eiler Project Record). As a result, while 12 percent of the project area had a barren cover type prior to the Eiler Fire, 74 percent was considered barren post-fire, with the largest losses of vegetative cover seen in ponderosa pine forest (including plantations), Sierran mixed conifer forest, and chaparral (Silviculture Report for the Eiler Fire Salvage and Restoration Project, Eiler Project Record).

Habitat conditions associated with moderate to high intensity burns include a lack of surface vegetation and duff and a reduction in overstory cover. Early seral habitats, characterized by full sun conditions and lack of established native plant cover, are vulnerable to invasive plant establishment. In addition, Eiler Fire suppression efforts included the creation of fire line, helicopter landings, and hand crew activities throughout the project area (USDA FS 2014a), actions that are also associated with soil disturbance and removal of surface vegetation. The project area has also experienced ground disturbance over time from routine road construction and maintenance activities, timber harvest activities, fuels reduction activities, site preparation and reforestation activities, prescribed fire activities, other wildfires, and general recreation use (Past, Ongoing, and Reasonably Foreseeable Future Actions (PORFFA) Report for the Eiler Project, Eiler Project Record).

In sum, areas that burned at moderate to high intensity (11,535 acres) in the Eiler Fire of 2014 have a **high** habitat vulnerability to invasive plant establishment.

### **3. Vectors Not Related to Project Implementation**

Several types of vectors may contribute to the spread of invasive plants even though they are not associated with Eiler Project implementation. Fire lines created during the Eiler Fire suppression effort constitute a network of disturbed ground that provides greater connectivity between patches of early seral habitat that are vulnerable to invasive plant invasion. Weed washing stations did not arrive until nine days into fire suppression activities, increasing the chance that vehicles may have brought in weeds from outside of forest boundaries. Aerial firefighting operations may have also served as vectors during the fire. Helicopters utilized a helibase that was known to be infested with yellow starthistle, and landed repeatedly within the Thousand Lakes Wilderness (USDA FS 2014a). In addition, the ongoing recreational use of roads within the project area creates vectors for invasive plant spread, particularly along the heavily-travelled 26 Road.

Invasive plant vectors are also associated with proposed timber harvest activities associated with Eiler Fire salvage efforts on adjacent private lands (PORFFA Report for the Eiler Project, Eiler Project Record). System roads within and adjacent to the project area would receive increased traffic from timber harvest activities on adjacent lands, and may serve as vectors for weed spread as weed seeds or propagules affix to mud on vehicle tires. Roads 34N76, 34N19, and 33N25 have received heavy use by private timber harvest traffic during salvage operations on private lands. These increased vectors constitute short-term effects that would not persist beyond the implementation of these projects.

Motorized vehicle traffic associated with other ongoing and foreseeable future actions within and adjacent to the project area constitute additional invasive plant vectors. These include hazard tree removal associated with recreation and administrative sites, sites, personal fuelwood woodcutting traffic, and routine trail and road maintenance (PORFFA Report for the Eiler Project, Eiler Project Record).

There are no grazing allotments within the Eiler Project area, and so livestock do not represent a vector for weed spread for this project. Wildlife may spread weeds when propagules stick to hair, feathers, or hooves, or are deposited in droppings, however this is of only minor concern.

Overall, weed vectors that are not related to project implementation pose a **moderate to high** risk of invasive plant invasion due to timber harvest activities on adjacent lands and high levels of associated motorized traffic within the project area.

## **Factors Related to the Proposed Action**

### **4. Habitat Alteration Expected as a Result of Project Implementation**

Project activities with the greatest potential to alter habitat include activities that would result in changes to existing canopy cover and activities that would create patches of bare mineral soil. Increased canopy cover is associated with less favorable conditions for invasive plant species, while increased soil disturbance would favor invasive plant establishment and spread.

Changes to canopy cover would result from both timber harvest, fuels treatments, and reforestation activities. Timber harvest is proposed on a total of 8,702 acres, where hazard tree, area salvage, and area fuels treatments would remove fire-killed trees or trees with a high probability of near-term mortality. While snags would provide some short-term shade in the absence of the proposed action, they would fall over time, and their proposed removal would have only a negligible effect on long-term tree canopy cover. Reforestation activities would occur on 5,645 acres. Of these acres, 2,334 would be planted with conventional spacing, and 3,301 acres would be planted with cluster planting or in founder stands. Cluster planting and founder stand reforestation acres would result in a lower tree canopy cover than acres planted within conventional spacing. Site preparation and release activities on these acres would result in a short-range decrease in shrub cover, which may increase habitat vulnerability to invasive plant invasion. This would be offset, however, by reforestation activities that would re-establish tree canopy cover within these units. As these trees establish and grow, they would increase tree canopy cover and over the long-term, decrease habitat vulnerability to invasive plants.

Ground disturbed by project activities would increase favorable habitat for invasive plants within the project area. Vegetation removal and soil disturbance associated with the timber harvest, area fuels treatments, site preparation activities, release activities, and the construction of one mile of temporary road and one mile of new system road would create patches of bare ground that opportunistic invasive plant species could exploit, should seeds or propagules be introduced to the disturbed areas. Fuels treatment activities are proposed on 8,702 acres. Pile burning activities and broadcast burning activities

would scorch or kill understory vegetation and remove duff within burn pile footprints. In addition, mechanical, ground-based equipment used for machine piling activities would create patches of soil compaction and/or soil disturbance.

Overall, the invasive plant risk due to project-related habitat alteration is **moderate to high**.

## **5. Increased Vectors as a Result of Project Implementation**

The Eiler Project has the potential to increase the risk of invasive plant establishment or spread by creating new vectors for weed spread or increasing the probability that existing vectors would bring weeds into the project area. System roads within the project area would receive increased traffic from project-related activities. Mechanical ground-based equipment may serve as vectors for weed spread as weed seeds or propagules affix to mud on vehicle tires and equipment. In particular, invasive plants occurring along major thoroughfares (such as yellow star-thistle along 34N76, LNF #52) may have an increased risk of spreading further along roads and into burned habitat as a result of project implementation. In addition, two miles of road would be built for project implementation and would serve as new vectors for weed spread. One mile of this is temporary construction that would be decommissioned after use, and so would not serve as a long-term vector for invasive plant spread.

Overall, risk from increased weed vectors that would result from project implementation is **low to moderate**.

## **6. Integrated Design Features**

The following Integrated Design Features implemented as part of the proposed action would greatly reduce the invasive plant risk factors described in this document:

1. Staging of equipment would be done in weed-free areas.
2. Known noxious weed infestations would be identified, flagged where possible, and mapped for this project. Locations would be displayed on contract maps. Identified noxious weed sites within or adjacent to the project area containing isolated patches with small plant numbers would be treated (hand pulled or dug) by forest botany staff prior to project implementation. Any larger or unpullable infestations would be avoided by harvesting equipment, or equipment used would be washed on site before leaving the infested area and entering un-infested areas to prevent spreading weeds within the project area.
3. New small infestations identified during project implementation would be evaluated and treated according to the species present and project constraints and avoided by project activities. If larger infestations are identified during implementation, they would be isolated and avoided by equipment, or equipment used would be washed on site before leaving the infested area and entering un-infested areas.
4. Mechanical equipment would be excluded from known infestations of yellow starthistle (LNF #97) and medusahead (LNF #79) on Brown Butte.

5. Post-project monitoring for implementation and effectiveness of weed treatments and control of new infestations would be conducted as soon as possible and for a period of multiple years after completion of the project.
6. If project implementation calls for mulches or fill, they would be certified weed-free. Seed mixes used for re-vegetation of disturbed sites would consist of locally-adapted native plant materials to the extent practicable.
7. As part of pre-haul maintenance, Road 34N76 would be bladed or scraped prior to project implementation to ensure that yellow starthistle along this road is not moved into the project area.

## **7. Summary of Anticipated Weed Response to Proposed Action**

The Eiler Project area contains fifteen known invasive plant occurrences. Of these, four occur within proposed treatment areas. The three occurrences that present the greatest risk of spread include the yellow starthistle (LNF #97) and medusahead (LNF #79) on Brown Butte (scattered across several hundred acres), and the yellow starthistle that lines heavily-travelled Road 34N76 (LNF #52).

While project-related factors that contribute to invasive plant establishment and spread are addressed through the development of Integrated Design Features, factors not related to project implementation are not. Such factors operate independently of the proposed action, and would pose a moderate to high risk of spreading weeds even in the absence of the proposed project. Major factors that are not related to project implementation include high habitat vulnerability due to the Eiler Fire, which burned 75% of the project area at moderate or high severity, removing forest and shrub canopy cover and exposing mineral soil. In addition, Eiler Fire suppression efforts, salvage timber harvest activities on adjacent private lands have resulted in increased vectors for invasive plant introduction and spread.

Invasive plant risk factors related to project implementation include those associated with habitat alteration and increased vectors for spread. Several components of the proposed action (timber harvesting activities in hazard tree, area salvage, and area fuels treatment units; site preparation and release activities in reforestation units; pile burning and broadcast burning) increase favorable habitat for invasive plants where soils are disturbed. This is partially offset by the long-term net gain in tree canopy anticipated as a result of reforestation activities. Overall, project-related habitat alteration presents a moderate to high risk of invasive plant introduction and spread. Project-related invasive plant vectors present an overall low to moderate risk, due to increases in mechanical equipment traffic related to project implementation, and the construction of one mile of temporary road and one mile of new system road. However with the incorporation of Integrated Design Features as part of the proposed action, risk factors for invasive plant establishment and spread within the project area would be reduced. Mechanical equipment would be excluded from the large infestations of yellow starthistle and medusahead on Brown Butte, and Road 34N76 would be bladed or scraped prior to project implementation to reduce the risk that the yellow

starthistle along the road would spread. Overall, with incorporation of IDFs, there is a **moderate** potential for weed introduction and spread with the implementation of the Eiler Project (Table 3).

**Table 3: Summary of Eiler Project Invasive Plant Risk Assessment**

<b>Factors Independent of Proposed Action</b>	
Inventory Status	Incomplete
Known Occurrences	14 occurrences (three C-rated occurrences and one A-rated occurrence within treatment units)
Current habitat vulnerability	High Vulnerability
Non-project-dependent vectors	Moderate to High Risk
<b>Factors Related to Proposed Action</b>	
Habitat alteration expected as a result of project	Moderate to High Risk
Increased vectors as a result of project implementation	Low to Moderate Risk
Integrated Design Features	Reduced Risk
<b>Anticipated Weed Response to the Proposed Action</b>	<b>Moderate potential for weed establishment and spread</b>

## 8. Costs

Invasive plants can reduce the value of public lands. Timber production, grazing, wildlife habitat and recreational opportunities are all negatively impacted by invasive plants. Furthermore, invasive plant control is expensive and labor-intensive. Prevention and control of small infestations can reduce these impacts and decrease overall weed control expenditures. Invasive plant surveys, control of small infestations, and post-project monitoring are therefore vital in reducing overall impacts and costs from invasive plants.



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